Like a Moth to an *Interrupted* Flame: Modifying the CDC Light Trap to Increase Capture Species Richness

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Figure 1

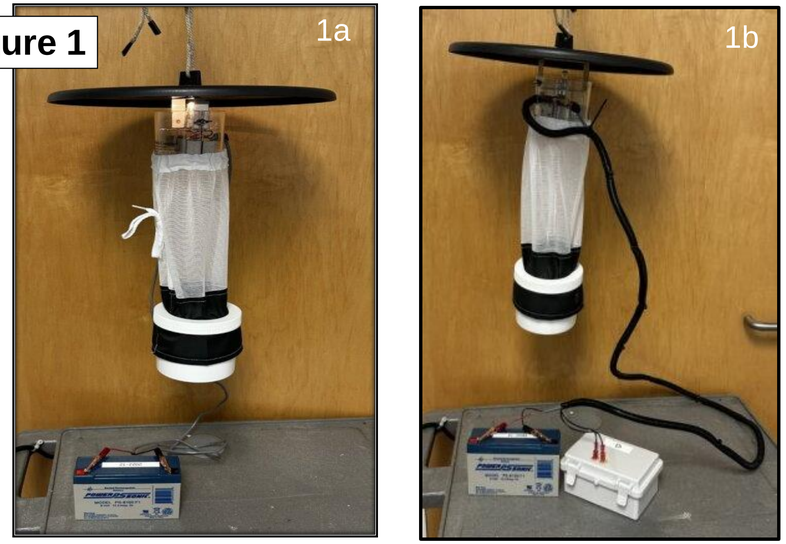

Figure 1.
a) Standard CDC Light Trap Setup
b) Modified WAMO CDC Light Trap Setup

Figure 2

Figure 2.
a) *Aedes triseriatus* (native La Crosse virus vector)
b) *Aedes japonicus* (invasive La Crosse virus vector)
c) *Aedes albopictus* (invasive La Crosse virus vector)

Overview:

The CDC Miniature Light Trap (**Figure 1a**) is an important tool used for mosquito surveillance and risk assessment for arboviral disease. The fan-based trap is typically baited with CO_2 and uses an incandescent light to attract phototactic mosquitoes – typically nocturnal and crepuscular species. Some mosquitoes, particularly daytime active *Aedes* species are not readily attracted to the light, but do host seek and orient towards CO_2 plumes. Mixed evidence in the literature also suggests that removing the light source may increase the collection of some *Aedes* species (**Fig. 2**). Here we sought to modify the existing light trap by adding a programmable light-interrupting mechanism so that the trap may operate both with the light on and off giving opportunities for the trap to collect mosquito species that exhibit both positive and negative phototaxis. A "WAMO" (WCU Arduino Mosquito trap Oscillator) was designed to control the periodicity of the incandescent light (**Fig. 1b**). Here we describe how the system was designed using an Arduino open-source electronic prototyping platform (**Fig. 3**). Blink (light oscillating) intervals of 15 minutes (**Fig, 4**) will be used in the 2024 field season and compared with the traps with and without lights. The working hypotheses is that we will increase the relative abundance of *Aedes* species and increase the overall species richness in trap collections, thus reducing the need for multiple traps.

Next Steps:

1. Use the WAMO Trap for summer 2024 research in WNC -- Using a 3x3x3 Latin square design, conduct trap-type studies to compare WAMO against a standard CDC trap with light on and a trap with light off (trap-type study)
2. Build additional traps for UF to utilize in an analogous trap-type study in Florida (higher mosquito species diversity)
3. Analyze data to evaluate if the WAMO's light-oscillation is increasing species richness catch

Figure 3

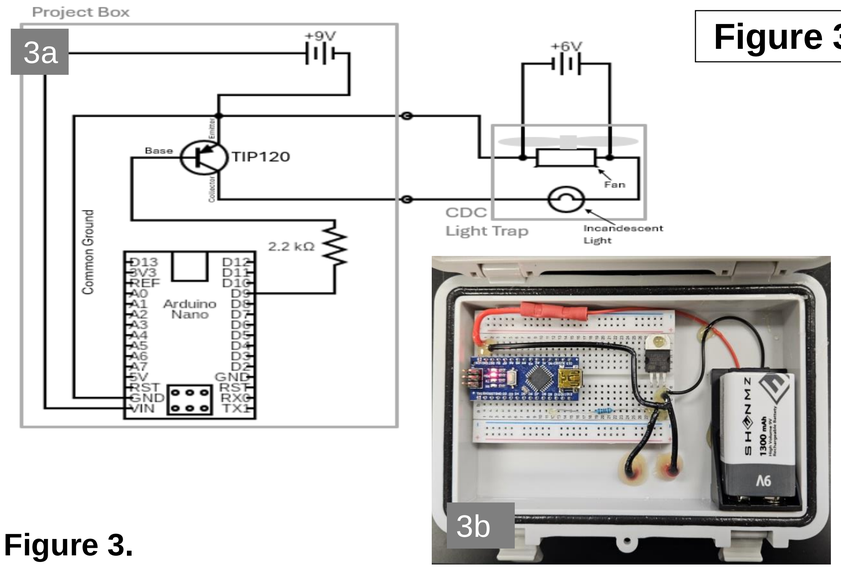

Figure 3.
a) WAMO Trap Circuit Schematics
b) WAMO Project Box Interior

Figure 4

Figure 4. Blink interval of 15 minutes (WAMO Light Trap)

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